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# NOTES ON THE NATURE OF HARMONY

By OTTO ORTMANN

THE word "harmony," in its broadest connotation, applies to any combination or succession of simultaneous tones. Such an application of the word includes regions of tone hitherto musically unexplored, virgin-fields that but await the touch of the capable and observing composer before unfolding their beauties; beauties other than those to which we have been accustomed, but beauties none the less. Strangely enough, the particular field selected for recent exploitation—the whole-tone scale—is by its very nature the least rich in internal variety of tone color. There are many other scales—Scriabine has used some—that offer distinctly greater advantages in this respect. I shall forego the pleasure of exploring these inviting regions here. Instead, I shall content myself with an analysis, albeit fragmentary and somewhat belated, of what is really at the bottom of the system of harmony which, founded by Rameau, has given us such works as the *B minor Mass*, the *Beethoven Symphonies*, *Feldeinsamkeit*, and *Don Juan*.

This system, as everyone knows, is based upon a relationship of Fifths, numerically represented by 2:3. The octave, it is true, represents a simpler ratio, namely 1:2, but in harmony, octaves are conceived as identicals, which precludes their being used as basis for the development of a system. Their identity, however, permits an octave transposition which does not involve a change in the nature of the chord thus transposed. Such a transposition I shall make use of later. But the Series of Fifths, in itself, does not constitute the entire basis of our harmonic system. Taken alone, such a scale of fifths embraces a wider range than that which includes all that we call good writing. Here again is an unworked field, waiting for appropriate musical manipulation.

With the physiological basis of harmony I am not here concerned. The promising theories of Shambaugh, Kishi, and Hardesty may lead to an adequate physiological explanation, impossible in terms of the basilar membrane theory of Helmholtz, notwithstanding certain peculiar advantages of the latter theory.

The concept which gives our system of harmony its individual character, a physiognomy which, though clearly defined, is yet

ignored with annoying frequency, is the concept of Tonality. Tonality or Key, is the selection of one tone as principal tone and of certain other tones as more or less subordinate tones. This subordination involves relationship, and in this relationship is found the key to the nature of harmony built upon such a scheme. They who have read their d'Indy, Gariel, Riemann, Strube, and Robinson will understand the importance of the principle of relativity embodied in the tonality concept, and the logic of the harmonic analysis here attempted. The principles advanced, accordingly, are not new, but it is hoped that the following sketch may throw light from a new angle upon the realization that a fundamental shift of viewpoint is necessary for the teaching and appreciation of harmony as an element of artistic music. Among other things the famous "Don't Trespass" sign, long posted on areas reserved for the great composers—although the latter never as much as suggested reservation—must come down. It should never have been put up.

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\*

The present chordal basis of harmony is a triad, generally speaking, either major or minor. This basis is not permanent. Twelve centuries have seen its progress from the simplest ratio of 1:2 in primitive octave music, to the 2:3 and the 3:4, the fifth and the fourth relation, respectively, of the Organum; thence through the 3:4:5, the fourth and sixth ratio of the Fauxbourdon, to the 4:5:6 ratio of our major triad. The Tierce de Picardie still reflects the reaction to the minor triad as a dissonance; the present time shows signs of accepting other, more complex chords, as complete consonances, and the future will record the passage of subjective consonance to yet higher ratios. The so-called major and minor duality of our harmonic system is not as sharply defined as we are often led to believe, for the differences in consonant or dissonant character of the two chords are too great to permit interchangeable use. Here the attempt at analysis will be made from the basis of the major triad only. The conclusions reached apply, in general, to the minor triad also, allowing for the differences in the scales of the two modes and in the ratios of the two chords.

Let us choose C as the central tone of a tonality or key which we call C major. Since our simplest ratio is the 2:3 the next related tone will be G. Not lower F, for C would be related to F as 3:2. We take the fifth in an ascending direction because

whatever be the modifications it has met with, the harmonic basis in nature is the harmonic series of overtones, not undertones, in spite of Riemann's splendid hypothesis. As we continue the selection of tones on the basis of ascending fifths, we get



Another fifth, F#, would take us out of the tonality of C major. The tones given, therefore, form the tonality as far as a series of fifths can do so, and since there is no other source from which to draw, these tones must form the entire harmonic basis.

By building a triad on each of the given tones, we get:



The *triad* on B, since it is a diminished triad, must be excluded from the real harmonic basis, which is limited to major and minor. It is included here merely to bring out more clearly certain relationships described later.

Obviously, at the pitches indicated, the sounds are musically not serviceable, or at least less so than in some other relation. Accordingly, we transpose by octaves, a transposition, which, as we have seen, does not alter the nature of the chord. Thus transposed, our series becomes:



This gives us a central chord *U*, to which five other chords are more or less related. As we pass from *U* to *M*, we pass upward in fifths, away from the key-tone or the key-chord. As we pass from *M* to *U*, we pass downward in the series of fifths and toward the key-chord. The chord *S* is nearest related to the key-chord, the chord *R* next and so on. In this relationship is the first harmonic principle: musically a chord is always a part of a tonality, and bears various relations to the other chords of that tonality.

The second principle is that all chords tend to pass *into* the key-chord. The latter is a point of rest to which the other more

or less transient chords tend to lead. Consequently, triads differ not only in their structure, but also, and this is the important point, in function. In the key of C major, every triad other than that on C is harmonically, musically, or tonally, a dissonance, and demands harmonic resolution as much as a seventh or a suspension demands its non-harmonic resolution. The musical purpose of a succession of chords is the establishment of the key of which they are a part, for tonality is one of the two basic harmonic concepts. Such fixing of key is accomplished by progressing *toward* the key-chord and not away from it. And it will be found that any succession of chords passing along the series from *O* to *U* is a harmonically acceptable progression. It is this because it adheres strictly to the true harmonic progression, a progression in descending fifths.

Chords stand in true harmonic relation only if their roots are a fifth apart. The basic interval of chord structure, however, is not a fifth, but a third. Accordingly, the third is a harmonic interval. It cannot be primary because it is not present in the original series of fifths. The *E* in the series, Fig. 1, for example, has a different harmonic function from that of *E* used as third of a triad on *C*. But it can be secondary, because the chords which we built upon the single tones of Fig. 1 contain not only a fifth, but also the interval of a third. By placing triads in third-relationship to those already derived, we get as our complete chordal series:



The added chords are *N*, *Q*, *T*. They could not come at any other points in the original series because they would then not stand in harmonic relation to the neighboring chords, the basis of primary harmonic relation being a fifth, that of secondary harmonic relation, a third. The primary harmonies of C major are the chords *O*, *P*, *R*, *S*, *U*. And the secondary harmonies are the chords *N*, *Q*, *T*. But is not *N* the same as *S*, and *T* the same as *O*? Not at all! This point illustrates the most fundamental error to which the usual treatment of harmony has been subject. It results from the mistake of considering chords as separate entities, irrespective of their environment, from placing their structure first and their function second. *Harmonically speaking, an isolated chord does not exist.*

Since there is but one basic harmonic relation, that of the fifth, all harmonic progressions are primarily felt in this relationship. Thus the secondary relation of the third, is an incomplete relation of the fifth, and tends so to be felt. That is, *N*, in Fig. 4, has the harmonic function of *O*; *Q* has the harmonic function of *R*; and *T* has the harmonic function of *U*. *N* could not have the harmonic function of *M*, nor *Q* of *P*, because that direction is anti-harmonic, away from the key-chord instead of toward it. Now we are back to our original series of fifths:



and we see that it is the environment which *makes* the chord. The musical value and nature of the latter changes with each change in the environment. In the series given, *N* is not *S* but an incomplete *O*; *T* is not *O* but an incomplete *U*. *Q*, generally viewed as sub-dominant, demands some further explanation.

There is no self-existing harmonic sub-dominant function in music. For we have seen that our series of chords of primary relationship leaves no room for an *F* as independent tone. It has been explained as a secondary relation. But what is more important, is, that, thus explained, it has a *dominant* function, because it is related to *R*, the second chord in the dominant series of fifths. The F-A-C when used as a sub-dominant, is an entirely different chord in function. The sub-dominant effect, which is not really a progression anti-clockwise around the circle of fifths, depends upon a preceding dominant effect. The progression IV-I is really only felt as IV-I when it has been preceded by some V-I progression. Played alone, without accent, IV-I is usually felt as I-V. (The numerals used merely designate the chordal structure). Thus the effect of the Plagal Cadence depends upon a preceding form of the Authentic Cadence, for the true character of the sub-dominant is a deviation from the dominant, or harmonic progression, and where the latter has not existed, the former obviously cannot exist. The charming, often unusually beautiful effect of a sub-dominant coda, depends upon the contrast with the preceding dominant effect. Why, for example is the typical harmonic form of a period I-V-I-IV-I and not I-IV-I-V-I? The chord *Q* therefore (Fig. 5), has not a sub-dominant function at all, it is a dominant chord, that is, it belongs to the dominant series. Its use as a

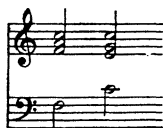
sub-dominant falls on the other side of the chord *U* (Fig. 5), and naturally introduces other anti-harmonic relationships.

By considering the secondary harmonies as incomplete primary harmonies, the weakness of certain chord progressions, and the strength of others may be explained. Thus the progression *M-N-O* or *S-T-U* is *harmonically* weak because it is really a harmonic reiteration, V-I-I, and reiteration stops harmonic flow. The value of chord reiteration is found in the melodic aspect of music, hence the rule to use chord repetition in places where a marked melodic shift is required or desired. On the other hand, as has been pointed out, any chord progression such as *Q-S-U* is good, because *Q* being harmonically *R*, produces the perfect primary progression *R-S-U*. *The succession [M]-O-P-R-S-U with its modification [M]-N-P-Q-S-U or any part thereof, taken in the given direction, is the only fundamental harmonic progression in all music.*


All other chord progressions are melodic, not harmonic in function. They have their essence in diatonic or chromatic progression, as the true harmonic progressions have their essence in the harmonic fifth-relationship. It is true, that even in the harmonic series, some of the upper voices, but never the bass, will move in diatonic steps, that is, melodically, but it is also true that such progressions are determined far less by this factor than by the harmonic relation existing between the chords. Proof of this is found in the greater freedom with which primary harmonic progressions are connected as compared to the non-harmonic progressions. In the latter case, it is the melodic steps which make the progression *possible*. As a consequence, wherever there is diatonic progression on a bass other than a harmonic bass (fifth-relationship), the true harmonies are not represented by the chords as written.

All connections involving inversions of triads; seventh, ninth, and higher chords, with their inversions; suspensions, and altered chords, are melodic, not harmonic progressions. As such they obey the psycho-physiological laws of melody, which are essentially different from those of harmony as here outlined. As soon as we add a seventh, or a ninth, or any dissonant interval to a triad, this added tone has a melodic function.

This leaves the clock-wise, anti-harmonic fifth-progressions, such as *S-R-P* in the Figures, to be explained. These, too, without exception, are melodic in function, for they violate the second principle of harmonic progression, which demands movement *toward* the key-chord. But what of the progression



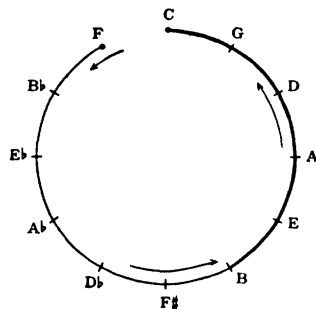
which certainly is musically acceptable? This is likewise a melodic progression. *Harmonically the sub-dominant cannot be explained as the under-dominant.* This becomes evident when we consider the different treatments which the IV-I and the V-I demand in music, and the difference in their effects, one of which is not the opposite of the other but involves a difference in kind. The sub-dominant stands in no harmonic relation to the tonic; the relationship is melodic. Far from being of almost the same harmonic importance as the dominant, the sub-dominant, through its *melodic* proximity to the tonic, is merely the most important example of the anti-harmonic fifth-progressions. The musical satisfaction which IV-I gives, is not the result of the harmonic progression of IV into I, but the result of the IV already being a I. That is,

the  is a discord, whether F is in the bass or not, a

double suspension resolving directly into the key-chord 

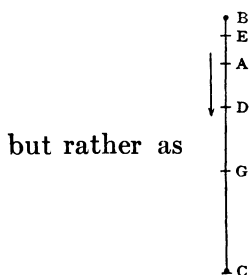
As a discord, its function is melodic. When introduced, in the coda, for example, by the seventh chord, (in C major by C, E, G, B $\flat$ ) it is also melodic, for all sevenths are melodic tones. The sub-dominant effect, therefore, is not a harmonic effect opposite to the dominant effect; it is a melodic effect of a different kind. *There is but one harmonic relation in music, and that is the dominant tonic relation.*<sup>1</sup> All else is melodic. The Circle of Fifths can only be explained anti-clockwise. Never in the reverse direction. It is not to be conceived as a figure symmetrical with respect to any

diameter. In the tonality of C, not as



<sup>1</sup>Strube: A Treatise on Harmony.



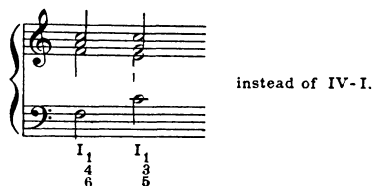


The third harmonic principle, which is but a further application of the two principles described, is that every discord is musically felt as a part of the tonality of which the next tonic harmony is the key-chord, regardless of the number of chords intervening, and often changing in function with the onset of a new phrase. The key-chord will consist of an uninverted triad, tonic function, on some metrically accented beat. (This last statement is but a generalization. It must suffice here, for even a brief treatment of the rhythmic aspect of harmonic progression, would take us too far afield.)

The first result of the application of these principles, is that we may no longer consider such chords as the cadential four-six and the passing four-six, or the dominant IV, represented in the figures by *Q*, and the sub-dominant IV, which represents a melodic relationship, as one and the same chord. Musically, and that, after all, is the point that counts, the forms of chords mentioned are as different as the major and the minor triads. Such a conception necessarily changes our system of figured bass completely. Fortunately, this change involves no great difficulty. The plan which first suggests itself is to number the central or key-tone I, then to number all other tones belonging to that tonality, that is, grouping themselves around this tone, which becomes both their aim and end, in relation to this I by counting the intervals from the *key-tone* instead of from the *bass-tone*. Thus:



instead of  $I - V_6 - I_6$  And as cadence:  
 $(V_2)(I_1)$



Next, for the sake of simplicity, we may dispense with the repetitions of I, with the understanding that a tonality continues until cancelled by another Roman Numeral. In like manner, I alone may stand for II<sub>1</sub>, and I<sub>1</sub>, for I<sub>1</sub>. The figuring for the first

3                      3  
5                      6                      6

example given is then I-I<sub>2</sub>-I. It is necessary to include 1 in all

5  
7

cases except I<sub>1</sub>. Such a plan may probably be modified to ad-

3  
5

vantage, and is given merely as a possible solution of the problem of figuring chords when conceived in relation to their tonality. Figured bass, after all, is but a convenient form of numerical analysis. The musical function of a chord, since it represents a subjective reaction, cannot adequately be represented by any fixed system of figures.

The C in the first chord is a seventh. But since sevenths stand in no harmonic relation to the chord (they are melodic tones), we need not be troubled by the ascent into D, for there is no melodic rule prohibiting ascent. The laws governing melody, even in terms of the Lipps-Meyer theory, involve factors essentially extraneous to pure harmonic progression.

Finally, by taking a more complex example for illustration, the extent to which true musical function differs from the figuring

of chords as generally viewed, will be made clear. Several musical conceptions of the phrase, with the resulting changes in harmonic function, are given, and the unabridged figuring for one of them is included.

Schumann. Bunte Blätter

V<sub>1</sub>  
4  
6  
7#  
 V<sub>1</sub>  
3  
6  
 V<sub>1</sub>  
2b  
4  
6  
7#  
 V<sub>1</sub>  
3  
5  
 I<sub>1</sub>  
3  
4#  
6b  
 I<sub>2</sub>  
5  
7#  
 I<sub>2</sub>  
4#  
6b  
7#  
 I<sub>1</sub>  
3#  
5  
 I<sub>1</sub>  
4#  
6b  
 I<sub>2</sub>  
5  
7  
 I<sub>3</sub>  
3  
4#  
6  
 I<sub>2</sub>  
5  
7  
 I<sub>2b1</sub>  
4  
6b  
7#  
 I<sub>2b</sub>  
4  
5  
7#  
 I<sub>2</sub>  
4  
6  
 I<sub>1</sub>  
3#  
5

G minor I  
 C minor V

The brevity with which all dissonant tones are disposed of as melodic tones may need a word of explanation in its defense. An analysis of the melodic principles was not attempted since we were concerned with the nature of harmony, and the very definition which we gave to harmony, precludes melody from being treated from any other than an almost opposite viewpoint. It may be said in closing, however, that the melodic conception of dissonances will be found to lead to a rational and musically adequate explanation of their use. One interesting result is the manner in which a melodic analysis explains the "raison d'être," if any, of the rules of harmony governing dissonances, inversions, and chord successions, many of which are inexplicable on the basis of harmonic relation. As long as we conceive sevenths and suspensions as different in musical nature and function; treat chords and their inversions as harmonic identicals; and speak of harmonic relation, such as the sub-dominant, where no harmonic relation exists, we cannot hope to arrive at any satisfactory conclusions. The plan here outlined, at least places the study of harmony upon a musical, and relatively fixed harmonic basis, namely: tonality and the descending series of fifths.